Course Unit Descriptor

Study Programme: Information Technology; Information Technology – Software engineering
Course Unit Title: Graph Theory
Course Unit Code: OAS123
Name of Lecturer(s): Assistant Professor Jelena Stojanov, PhD
Type and Level of Studies: Bachelor Academic Degree
Course Status (compulsory/elective): Elective
Semester (winter/summer): Summer
Language of instruction: English
Mode of course unit delivery (face-to-face/distance learning): face-to-face
Number of ECTS Allocated: 6
Prerequisites: None
Course Aims: Enabling students for abstract thinking and acquisition of basic knowledge on the graphs. The course objective is to develop special way of thinking in students while studying graphs as mathematical models of real phenomena. The importance is given to application of the knowledge in computer science problems. The objective is to enable students to create adequate graph and apply appropriate algorithm to solve initial problem.
Learning Outcomes: Students are able to use acquired knowledge in further education and in their professions. Students will be able to use graphs as abstract mathematical objects and to implement them in various real life problems.
Syllabus: *Theory:* Graphs: basic notions, isomorphism and invariants. Various types of graphs. Graph operations and subgraphs. The adjacency and incidence matrices. Walks, paths and cycles. Number of Walks. Connectivity. Warshall algorithm. Digraphs and their connectivity. Euler graphs. Coloring. Trees and basic properties. Prifer coding. Spanning trees. Rooted trees. Binary trees. Graph searches. Weighted graphs. Minimal spanning tree. Shortest-optimal paths: Floyd-Warshall algorithm and Dijkstra algorithm. *Practice:* During the lectures adequate examples from theoretical lectures are done, thus practicing the knowledge and contributing to the better understanding of the theoretical knowledge.
Required Reading: 1. Dž. E. Anderson: *Diskretna matematika sa kombinatorikom*, CET, Računarski fakultet, Beograd 2005. 2. D. Stevanović, S. Simić, V. Baltić, M. Ćirić: *Diskretna matematika, Osnove kombinatorike i teorija grafova*, DMS, Beograd 2008 3. V. Petrović: *Teorija grafova*, PMF, Novi Sad 1998 4. K. Ruohonen, *Graph Theory*, 2006. 5. R. Diestel, *Graph Theory*, Springer-Verlag, 2005.

Weekly Contact Hours: 4	**Lectures:** 2	**Practical work:** 2

Teaching Methods: Lectures are combined: theoretical part of the course is followed by characteristic examples presented for better understanding of the lectured material. The practice accompanies lectures; typical problems are solved and the knowledge from the lectures is deepened.

Knowledge Assessment (maximum of 100 points):

Pre-exam obligations	points	**Final exam**	points
Active class	-	written exam	50

participation			
Practical work	-	oral exam	20
Preliminary exam(s)	30		